

Raychem Cold Applied Splices and Ring Terminals

TE Connectivity's (TE) cold applied splice and terminals product line is designed as a single-component in-line splice that requires no heat to install. It seals the termination and prevents the ingress of moisture which can lead to insulation failure and breakdown of the electrical connection.

In this product, sealing is achieved by replacing traditional methods, such as grommets, greases, and tapes with a novel gel technology. A polymer outer layer provides electrical isolation.

VERSATILE

- Easy installation and application flexibility
- One-step termination and environmental protection
- No heating required for installation — safe for use on fueled aircraft

PROVEN TECHNOLOGY

- Reliable in a wide variety of environmental conditions
- Prevents water ingress under permanent pressure/weight
- Achieves environmental performance while maintaining:
 - Small profile
 - Electrical performance

MECHANICAL/ENVIRONMENTAL

- **Tensile Strength:** Exceeds that of spliced wire
- **Temperature Range:** -65°C to 150°C
- **Dielectric Strength:** 2500 V maximum
- **Insulation Resistance:** 5000 megohms minimum
- **Altitude Immersion:** 75,000 feet
- **Fluid Resistance:** MIL-L-7808, MIL-L-3699, MIL-H-5605 (Hydraulic), MIL-A-8243, MIL-C-59769, and MIL-T-5624 (JP-5)
- **Current Rating:** Defined by the size of the crimp, gauge of wire, and specification

PHYSICAL

- **Cross-Linked Gel Technology:**
 - Well-established gel sealing system
 - Versatile gel closure
 - Non-flowing gel
- Protects and seals on all conventional Mil Spec and commercial wire insulation systems

MATERIALS

- **Insulation Sleeve:** Transparent polyvinylidene fluoride
- **Metal Crimp Splice or Terminal:** Tin-plated copper
- **End Caps:** Thermoplastic, color coded
- **Gel:** Clear, flame-retardant silicone-based gel

STANDARDS

- SAE AMS-DTL-23053/8 (Insulation sleeve)
- SAE AS81824/12 for Splices
- SAE AS7928/14 for Terminals



AD-1381 Hand Crimping Tool

Tool is used to crimp cold-applied gel-filled splices with wires ranging from 26 to 12 AWG.

Specifications

DIMENSION

- **Overall Length:** 230 mm (9”) approx.

WEIGHT

- 350 g (12.3 oz.)

COLD-APPLIED SPLICE PRODUCT RANGE

- **D-436-36-COLD:** 26 to 20 AWG wire range
- **D-436-37-COLD:** 18 to 16 AWG wire range
- **D-436-38-COLD:** 14 to 12 AWG wire range

Ordering Information

AD-1381 Hand Crimping Tool

Model	Description	Part No.
AD-1381 Hand Crimping Tool	AD-1381	CS1660-000
Calibration Gauge	AD-1382	992013-000

ROHS Information can be found at the following website: <http://www.te.com/customer-support/product-compliance/>

This product must not be disposed of as municipal waste.



ORDERING INFORMATION

Mini-Seal Crimp Wire Splices – Cold Applied (Gel Filled)

TE Description	TE RPN	GPL P/N	Specification
D-436-36-COLD	CN1020-000	M81824/12-1	SAE AS81824
D-436-37-COLD	CN1021-000	M81824/12-2	SAE AS81824
D-436-38-COLD	CN1022-000	M81824/12-3	SAE AS81824



Ring Tongue Terminal – Cold Applied (Gel Filled)

TE Description	TE RPN	GPL P/N	Specification
D-436-1101-COLD	CW8662-000	M7928/14-004	SAE AS7928
D-436-1102-COLD	CW0419-000	M7928/14-008	SAE AS7928
D-436-1103-COLD	CW0421-000	M7928/14-016	SAE AS7928
D-436-1122-COLD	TBD	M7928/14-012	SAE AS7928
D-436-1123-COLD	TBD	M7928/14-020	SAE AS7928
D-436-1142-COLD	TBD	M7928/14-009	SAE AS7928
D-436-1143-COLD	TBD	M7928/14-017	SAE AS7928
D-436-1162-COLD	TBD	M7928/14-010	SAE AS7928
D-436-1163-COLD	TBD	M7928/14-018	SAE AS7928
D-436-1382-COLD	TBD	M7928/14-011	SAE AS7928
D-436-1383-COLD	TBD	M7928/14-019	SAE AS7928
D-436-1401-COLD	TBD	M7928/14-001	SAE AS7928
D-436-1402-COLD	TBD	M7928/14-005	SAE AS7928
D-436-1403-COLD	TBD	M7928/14-013	SAE AS7928
D-436-1601-COLD	TBD	M7928/14-002	SAE AS7928
D-436-1602-COLD	TBD	M7928/14-006	SAE AS7928
D-436-1603-COLD	TBD	M7928/14-014	SAE AS7928
D-436-1801-COLD	CW8661-000	M7928/14-003	SAE AS7928
D-436-1802-COLD	CW0418-000	M7928/14-007	SAE AS7928
D-436-1803-COLD	CW0420-000	M7928/14-015	SAE AS7928





MiniSeal High-Performance, Immersion-Resistant Crimp Splices

RUGGED

- Insulation and strain relief

CAPABLE

- MIL-Spec approval
- Small size
- Light weight

EASY TO USE

- Immersion-resistant crimp splices are on QPL for SAE-AS81824
- Easy installation

Applications

MiniSeal wire-to-wire splicing products offer solutions for hundreds of aerospace and defense applications. These environment-resistant splices provide excellent reliability, long term performance, MIL-S-81824/1 qualification, and a low installed cost.

MiniSeal crimp splices consist of a plated copper crimp barrel and a separate, heat-shrinkable, transparent sealing sleeve. They can be used on a combination of wires, from 1:1 to 10:10. MiniSeal splices are one of the smallest, lightest, and most environment-resistant splices available. They preserve the electrical integrity of the splice by preventing the penetration of liquids and the resulting chemical and galvanic corrosion.

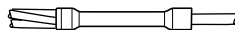
Product Selection Process

1. Determine the type of splice required.

- Stub (parallel) splice:



- Butt (in-line) splice:



2. Determine which crimp barrel plating is required:

- Tin plating, recommended for tin or silverplated wire
- Nickel plating, recommended for nickel-plated wire, or silver-plated wire in applications above 150°C [302°F].

3. Calculate the size of crimp barrel required.

Using the CMA/mm² worksheet on the next page, calculate the total cross section to be spliced by adding the circular mil area (CMA) or square millimeters (mm²) of each wire.

Stub splice: Add the CMA or mm² of all wires together.

Butt splice: Calculate each side separately (see example on the worksheet).

Table A provides the CMA of typical conductors. (Both CMA and mm² give the same results,

so choose either CMA or mm² as your unit of measure for selection purposes and continue to use it for all your selection criteria.)

4. Select the color code for the size crimp barrel required. Using Table B (page 24), select the crimp barrel—color-coded red, blue, or yellow—for the CMA or mm² you calculated.

Stub splice: Select the barrel that will accommodate the total cross section.

Butt splice: Select the smallest barrel that will accommodate the largest CMA/mm² required. (Refer to the example in the worksheet for a more specific description.) If the CMA/mm² of the smaller side of a butt splice is too small for the size barrel required to fit the larger side, increase the CMA/mm² — either by doubling back one wire (stripping the conductor twice the length you would ordinarily strip it and then folding it back) or by adding a filler wire.

5. Determine the type of sealing sleeve required. Some wire insulations will not fit in the holes of the sealing sleeve inserts, so be sure to compare the internal diameter of each hole with the outer diameter of the wire(s) you intend to insert in that hole. To create a reliable seal, place a maximum of two wires in any hole of the sealing sleeve.

6. Select the part number. Turn to the MiniSeal part number selection tables (Tables C and D, page 24 and 25) and find the table for the type of splice (stub or butt) required.

Using the appropriate table, find the crimp barrel size range and the size and number of wires for your application. Then select the part number for the type of plating required. The color code accompanying that part number should match the color code you arrived at in Table B, confirming that the part number you have selected is correct.



Table A. CMA of Typical Conductors

Strands	7	19	19	19	19	19	19	19	37
AWG	28	26	24	22	20	18	16	14	12
CMA	177	304	475	754	1216	1900	2426	3831	5874
mm ²	0.09	0.15	0.24	0.38	0.61	0.95	1.21	1.92	2.94

Table B. Crimp Barrel Color Code Selection

CMA Range	1:1 Splice (AWG Size)	Color Code
304–1510	26–20	Red
1058–2680	20–16	Blue
2375–6755	16–12	Yellow

CMA/mm² Worksheet

Example:

Application: A butt splice with three AWG 22 wires in one side and one AWG 18 wire in the other side:

The CMA for AWG 22 wire in Table A is 754.

Side one is therefore calculated as follows:

$$CMA = 3 \times 754 = 2262$$

The other side, where the CMA for AWG 18 is 1900, is calculated as:

$$CMA = 1 \times 1900 = 1900$$

Using Table B to select the smallest crimp barrel that will easily fit 2262 CMA, the blue barrel is the correct choice.

Wire Number	CMA	mm ²	
1	_____	_____	
2	_____	_____	
3	_____	_____	
4	_____	_____	
5	_____	_____	
6	_____	_____	
7	_____	_____	
8	_____	_____	
9	_____	_____	
10	_____	_____	
Total	_____	_____	Part Number: _____

Table C. Stub (Parallel) Splices



Illustration	Part No.		Crimp Barrel Size Range CMA Min.–Max.	I.D. dimensions			
	Tin Plated	Nickel Plated		Side 1		Side 2	
				Sealing Insert	Max. No. of Wires	Sealing Insert	Max. No. of Wires
	D-436-0128 Red	D-436-0119 Red	304–1510	 2.16 [.085]	2	 1.01 [.040]	2
	D-436-58 Blue	D-436-75 Blue	1058–2680	 4.56 [.180]	2	 2.28 [.090]	2
	D-436-59 Yellow	D-436-76 Yellow	2375–6755	 4.56 [.180]	2	 2.28 [.090]	2
	D-436-60 Blue	D-436-77 Blue	1058–2680	 2.03 [.080]	10 (2 per hole)	 6.35 [.250]	2
	D-436-61 Yellow	D-436-78 Yellow	2375–6755	 2.03 [.080]	10 (2 per hole)	 6.35 [.250]	2



Table D. Butt (in-line) splices

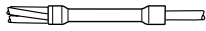


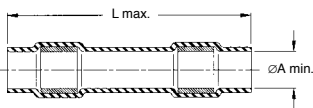
Illustration	Part No.		Crimp Barrel Size Range CMA Min.-Max.	I.D.dimensions			
	Tin Plated	Nickel Plated		Side 1	Max. No. of Wires	Side 2	Max. No. of Wires
				Sealing Insert		Sealing Insert	
	D-436-36* Red	D-436-82 D-200-82 Red	304-1510		2		2
	D-436-37* Blue	D-436-83 D-200-83 Blue	1058-2680		2		2
	D-436-38* Yellow	D-436-84 D-200-84 Yellow	2375-6755		2		2
	D-436-0110 Red	D-436-85 Red	304-1510		6		2
	D-436-52 Blue	D-436-86 Blue	1058-2680		6 (2 per hole)		2
	D-436-53 Yellow	D-436-87 Yellow	2375-6755		6 (2 per hole)		2
	D-436-0115 Red	D-436-88 Red	304-1510		6 (2 per hole)		6 (2 per hole)
	D-436-42 Blue	D-436-89 Blue	1058-2680		6 (2 per hole)		6 (2 per hole)
	D-436-43 Yellow	D-436-90 Yellow	2375-6755		6 (2 per hole)		6 (2 per hole)

*Qualified to MIL-S-81824/1.

Table E. Crimp Barrel Only

Type	Color Code	Tin-Plated	Nickel Plated	Crimp Barrel Size Range CMA Min. - Max.
Butt (in-line)	Red	D-609-06	D-609-09	304-1510
Butt (in-line)	Blue	D-609-07	D-609-10	1058-2680
Butt (in-line)	Yellow	D-609-08	D-609-11	2350-6755
Stub (Parrel)	Red	D-609-03	D-609-12	304-1510
Stub (Parrel)	Blue	D-609-04	D-609-13	1058-2680
Stub (Parrel)	Yellow	D-609-05	D-609-14	2350-6755

Table F. Sealing Sleeve Only



Part No.	Color Code	L Max.	A Min.
D-436-0096	Red	29.2 [1.15]	2.16 [0.085]
D-436-0097	Blue	29.2 [1.15]	2.8 [0.110]
D-436-0098	Yellow	29.2 [1.15]	4.32 [0.170]



Product Characteristics

Material	
Insulation	Radiation-crosslinked, heat-shrinkable polyvinylidene fluoride (D-436)
Crimp barrel	Tin- or nickel-plated copper
Meltable inserts	Meltable thermoplastic (D-436)
Typical Performance	
Voltage drop	6.9 mV at 4.5 A vs 8.1 mV for an equal length of wire
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.5 kV
Temperature rating	-55°C to 150°C [-67°F to 302°F] (D-436 Series)
Insulation resistance	5000 megohms

Specifications/ Approvals

Series	Military
D-436	SAE-AS-81824/1 for D-436-36/37/38

Installation Requirements

For proper installation of these devices, the correct crimp tool (TE part number AD-1377) and a heating tool and reflector attachment must be used.

Any one of the following TE heating tools is recommended:

- HL1920E/HL2020E
- AA-400 Super Heater

Refer to TE installation procedure RCPS-200-20 for detailed instructions and recommended reflector attachments.



AD-1377 Hand Crimping Tool

Tool is used for crimping wire terminations with MiniSeal splices.

Specifications

DIMENSION

- Overall Length: 230 mm (9") approx.

WEIGHT

- 350 g (12.3 oz.)

Ordering Information

AD-1377 Crimp Tool for MiniSeal Splices

Model	Description	Part No.
AD-1377 Crimp Tool	AD-1377-CRIMP-TOOL-3-CVTY	992008-000
Commercial Crimp Tool	AD-1377-S-SPEC-CRIMP-TOOL	959025-000
Calibration Gauge	AD-1386-CALIBRATION-GAUGE	992013-000

Accessories and Replacement Parts

Parts	Description	Part No.
Crimp Locator	AD-1377-103-CRIMP-LOCATOR	994855-000
Spring	AD-1377-P-E118-TOR-SPRNG	994123-000

ROHS Information can be found at the following website: <http://www.te.com/customersupport/productcompliance/>

This product must not be disposed of as municipal waste.





200° MiniSeal High-Performance, Immersion-Resistant Crimp Splices

In-line nickel plated sealed crimp splices for 200°C applications were developed for the growing needs of high temperature applications in the aerospace and defense industry.

200°C MiniSeal crimp splices provides the smallest, lightest, and the most environmental-resistant splices available, while meeting all requirements of SAEAS81812/11.

Applications

MiniSeal wire-to-wire splicing products are ideal for aerospace and defense applications where performance, reliability or size reduction is essential.

Designed to provide an immersion resistant in-line splice on 1:1 wires for the following: wire range from 26 AWG to 12 AWG; nickel-plated conductors and insulation rated for at least 135°C.

RUGGED

- Transparent heat-shrinkable insulation sleeve provides environmental protection and strain relief

EASY TO USE

- No need to staffer wire splices

VERSATILE

- Small size
- Light weight
- Immersion-resistant crimp splices while meeting all requirements of SAE AS81824/11
- Splices provide sealing to unetched wire insulations



Product Characteristics

Material	
Insulation	Heat-shrinkable, transparent blue, radiation cross-linked modified fluoropolymer
Crimp splicer	Base Metal: Copper alloy 101 or 102 per ASTM B75 Plating: Nickel per SAE AMS-QQ-N-290 Color Code: see table below
Meltable rings	Environment resistant modified thermoplastic fluoroelastomer Color: Light blue
Typical Performance	
Voltage drop	6.9 mV at 4.5 A vs 8.1 mV for an equal length of wire
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.5 kV
Temperature rating	-55°C to 200°C [-67°F to 392°F]
Insulation resistance	5000 megohms

Specifications/ Approvals

Series	Military
D-200	Meets the requirements of SAE AS81824/11

Part Numbers

Part No.	Color Code	Part Number
D-200-82	Red	D17660-000
D-200-83	Blue	A36675-000
D-200-84	Yellow	C60253-000

Product Dimensions

Product Name	Product Rev.	I.D.* a. min b. max	Crimp Splicer					Color Code
			øA	øB	C	D	E max.	
D-200-82	A	2.16 (0.085)	1.27 (0.050)	2.03 (0.080)	12.95 (0.510)	6.22 (0.245)	0.38	Red
		0.64 (0.025)	1.14 (0.045)	1.91 (0.075)	12.45 (0.490)	5.72 (0.225)	(0.015)	
D-200-83	A	2.79 (0.110)	1.75 (0.069)	2.70 (0.106)	14.86 (0.585)	7.11 (0.280)	0.51	Blue
		0.64(0.025)	1.63 (0.064)	2.57 (0.101)	14.35 (0.565)	6.60 (0.260)	(0.020)	
D-200-84	A	4.32 (0.170)	2.60 (0.102)	3.89 (0.153)	14.86 (0.585)	7.11 (0.280)	1.27	Yellow
		0.64 (0.025)	2.46 (0.097)	3.73 (0.147)	14.35 (0.565)	6.60 (0.260)	(0.050)	

*I.D.: a- As received; b- After unrestricted recovery thru meltable insert.

Product Name	MIL Spec Equivalent Size	Wire Range	Wgt. Lbs/Mpc max.
D-200-82	M81824/11-1	26-20	1.02
D-200-83	M81824/11-2	20-16	1.61
D-200-84	M81824/11-3	16-12	2.72